Wetland Studies

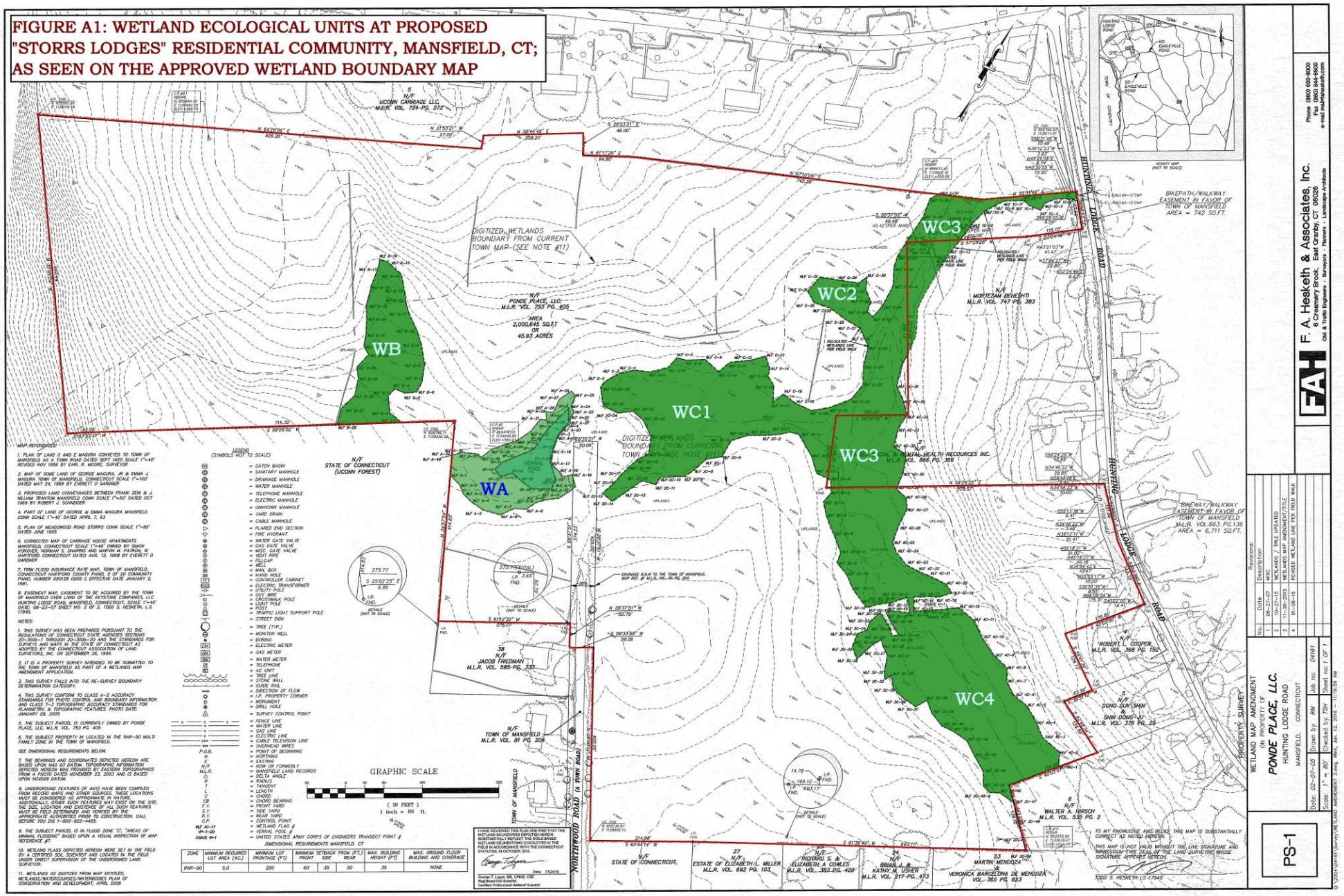
- BASELINE WETLAND/WATERCOURSE STUDIES - *Reports*
  - Wetland/Watercourse Delineations (1)
  - Wetland Characterization/Inventory (1)
  - Vernal Pool Studies (3)
  - Surface Water Quality Sampling & Stream Bioassessment (including Cedar Swamp Brook) (2)
  - Wetlands Functions & Values (1)
  - Soil Testing (1)

  Total hours in field: +/- 62.0 (September 2015 to July 2016)

- ANALYSIS OF POTENTIAL WETLAND/WATERCOURSE IMPACTS & MITIGATION - *Reports*
  - Wetlands Assessment & Impacts Analysis (1)
  - Review of Stormwater Management System: *Water Quality* (1)
  - Wetland Mitigation (1)

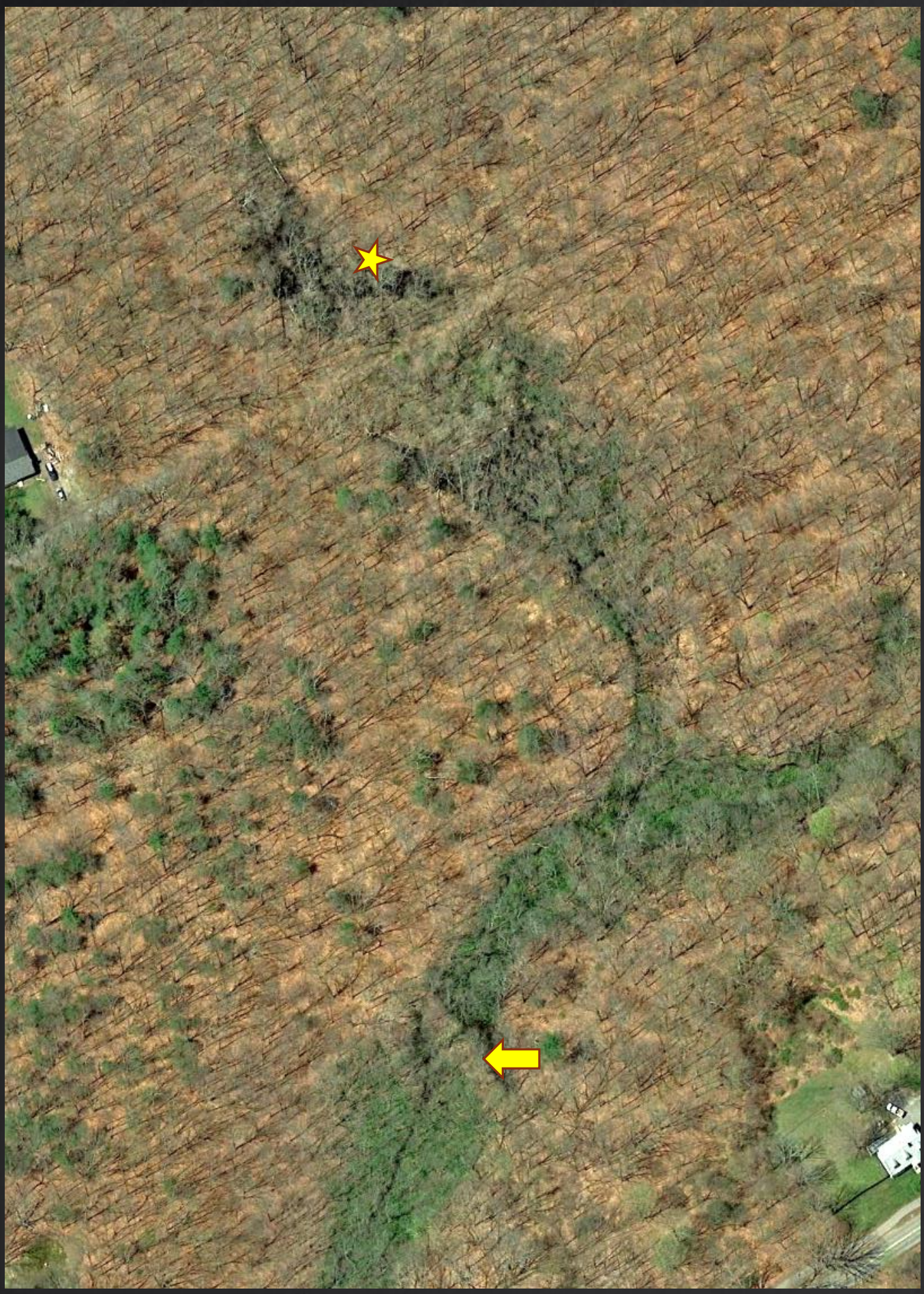
Wetland Ecological Units

FIGURE A1: WETLAND ECOLOGICAL UNITS AT PROPOSED "STORRS LODGES" RESIDENTIAL COMMUNITY, MANSFIELD, CT; AS SEEN ON THE APPROVED WETLAND BOUNDARY MAP



2013 Aerial Photograph

FIGURE 3: Proposed *"Storrs Lodges"* residential community, Mansfield, CT (as seen on a April 2013 aerial photo; Google Earth)



2016 Aerial Photograph

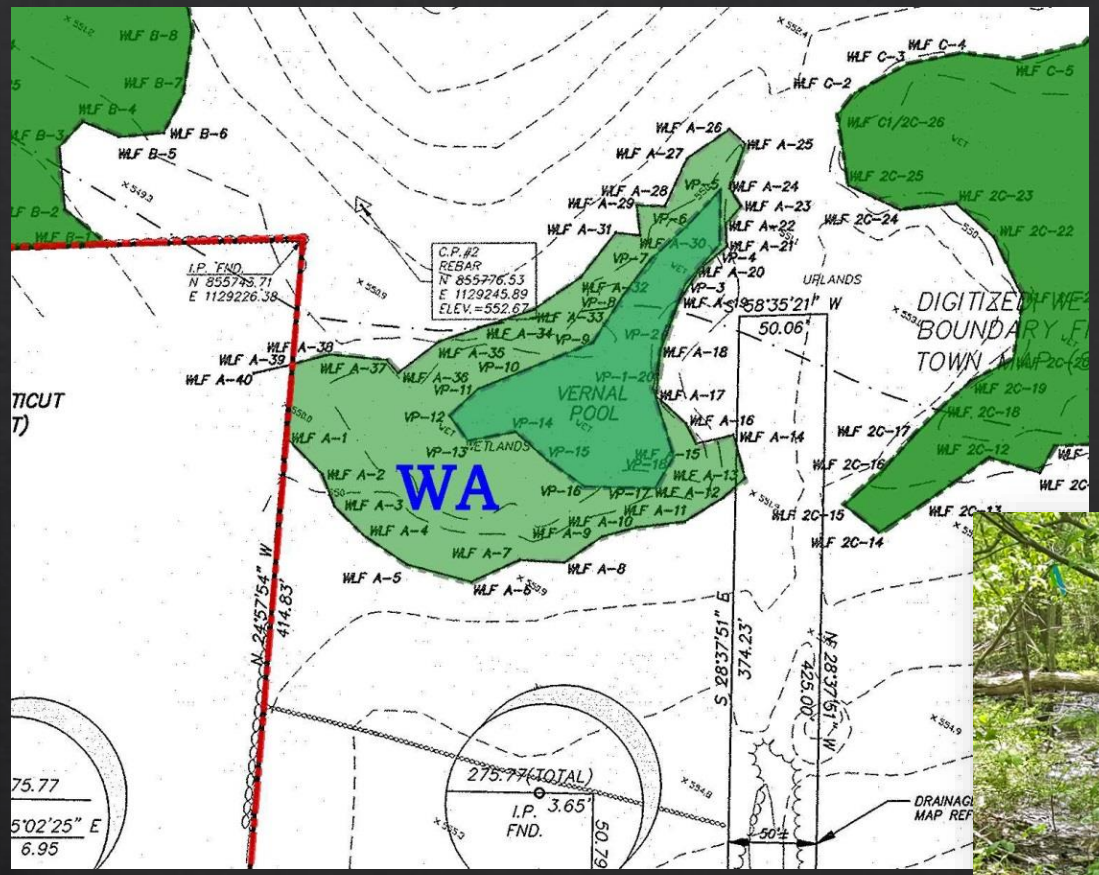
1965 Aerial Photograph

1970 Aerial Photograph

FIGURE 5: Proposed ***"Storrs Lodges"*** residential community, Mansfield, CT (as seen on an March 1970 aerial photo; CT

1986 Aerial Photograph

Wetland 'A' *("Vernal Pool Wetland")*



- Forested Swamp (Red maple)
- Seasonally Flooded
- In Cedar Swamp Brook Watershed

- Man-Enhanced Hydrology
- Breeding Habitat for:
  - Wood Frogs (78 egg masses)
  - Spotted Salamanders (5 egg masses)

Wetland ‘A’ (“Vernal Pool Wetland”)

- April 2016; northerly view

- Wood Frog egg mass

Wetland ‘A’ (“Vernal Pool Wetland”)

- Spotted Salamander Egg Mass

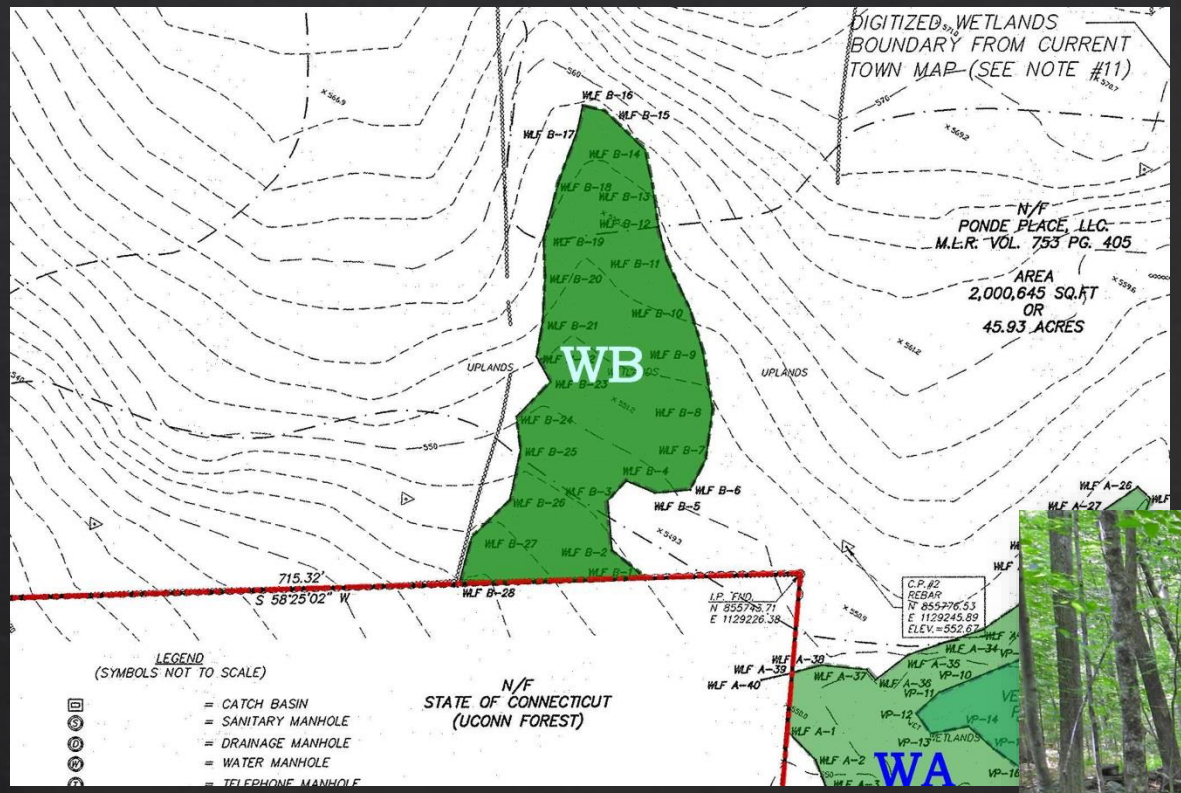
- Wood Frog tadpoles – 5-25-16

Wetland 'A' *("Vernal Pool Wetland")*

- 7-16-16; southerly view

- 7-16-16; westerly view

Wetland 'B' (*"Hillside Seepage Wetland"*)



- Forested Swamp
- Seasonally Flooded *and* Seasonally Saturated
- In Cedar Swamp Brook Watershed

- Seasonal hillside seepage
- Connects to off-site wetlands
- Low-Moderate Japanese Barberry understory

Wetland 'B' *("Hillside Seepage Wetland")*

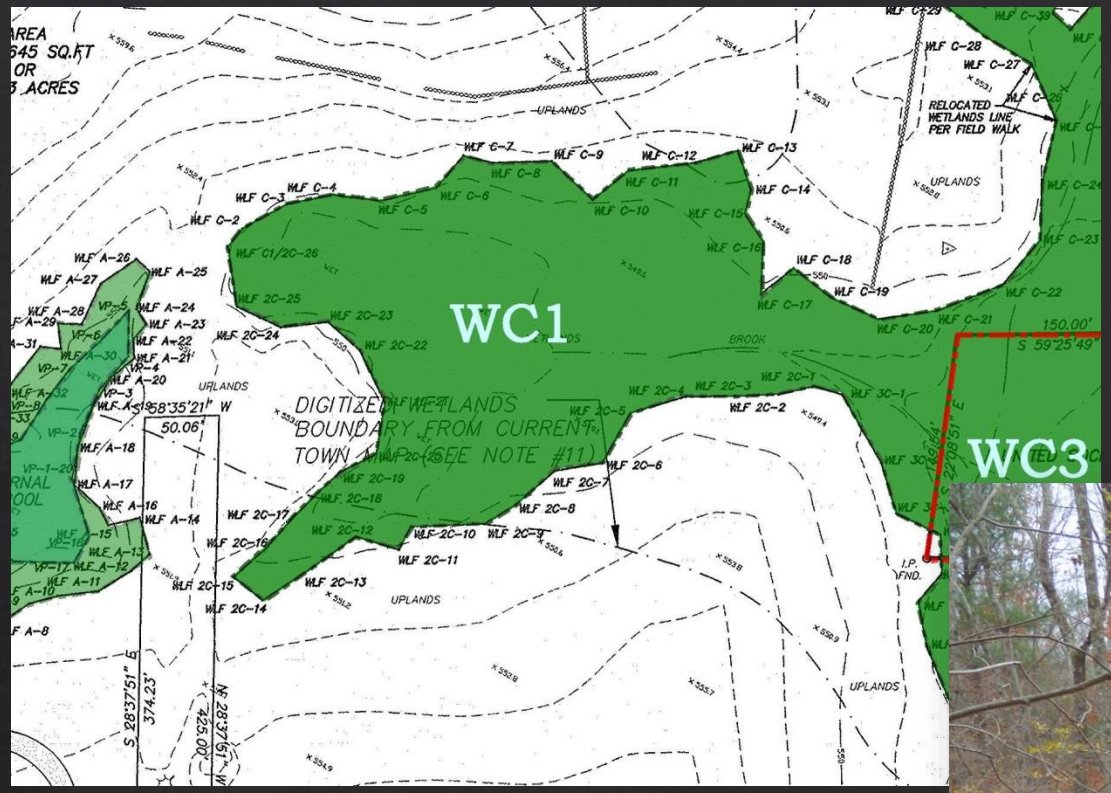
- May 2016
- Moderate understory plant diversity

- Moderate microtopography

Wetland 'B' *("Hillside Seepage Wetland")*

- Fall 2015
- Far upper (northern) section

Wetland ‘C1’



- Forested Swamp
- Seasonally Flooded, Seasonally Saturated, *and* Saturated
- Poorly and Very Poorly drained
- In Eagleville Brook Watershed

- November 2015; westerly view
- Moderate microtopography
- Low Japanese Barberry density
- Highest wetland plant diversity on-site (understory)

Wetland ‘C1’

- October 2015

- 7-16-16; southeasterly view

Wetland ‘C1’

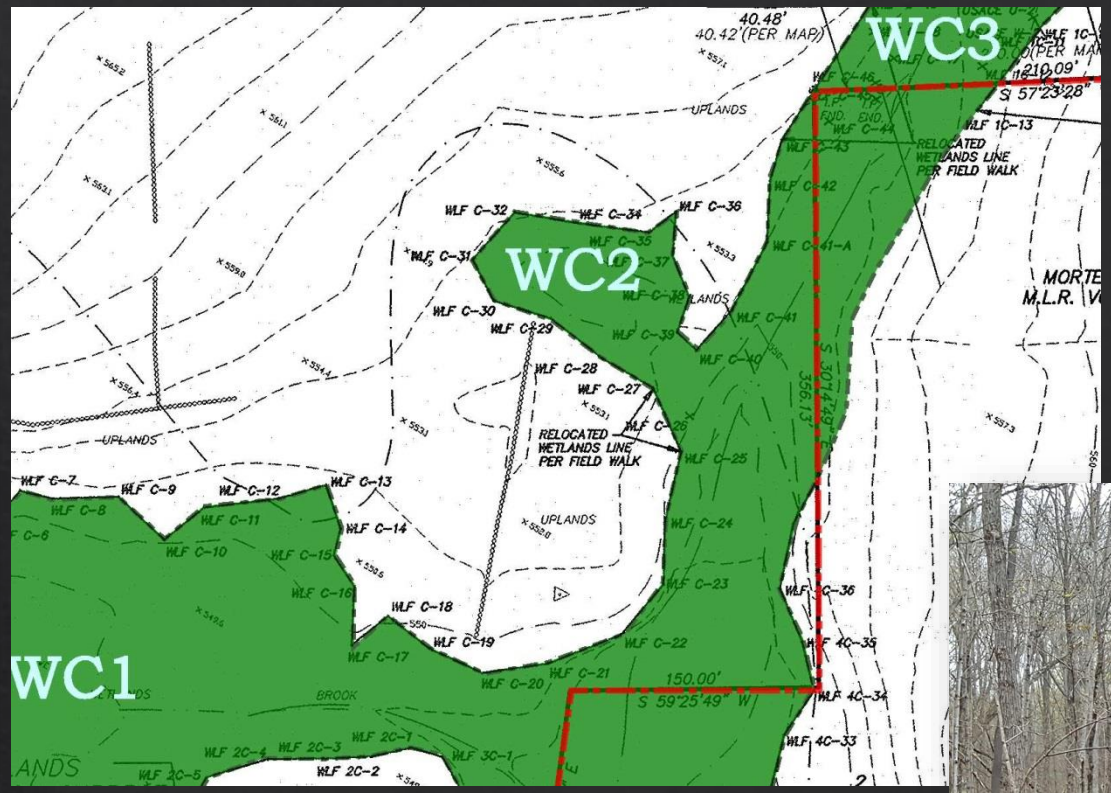
- 7-16-16
- Seasonally flooded to saturated; very poorly drained

- 7-16-16; westerly view
- Outlet intermittent stream

- September 2015
- Outlet intermittent stream
- Westerly view

Wetland ‘C1’

Wetland ‘C2’



- Forested Swamp
- Seasonal Seep
- Seasonally flooded to seasonally saturated

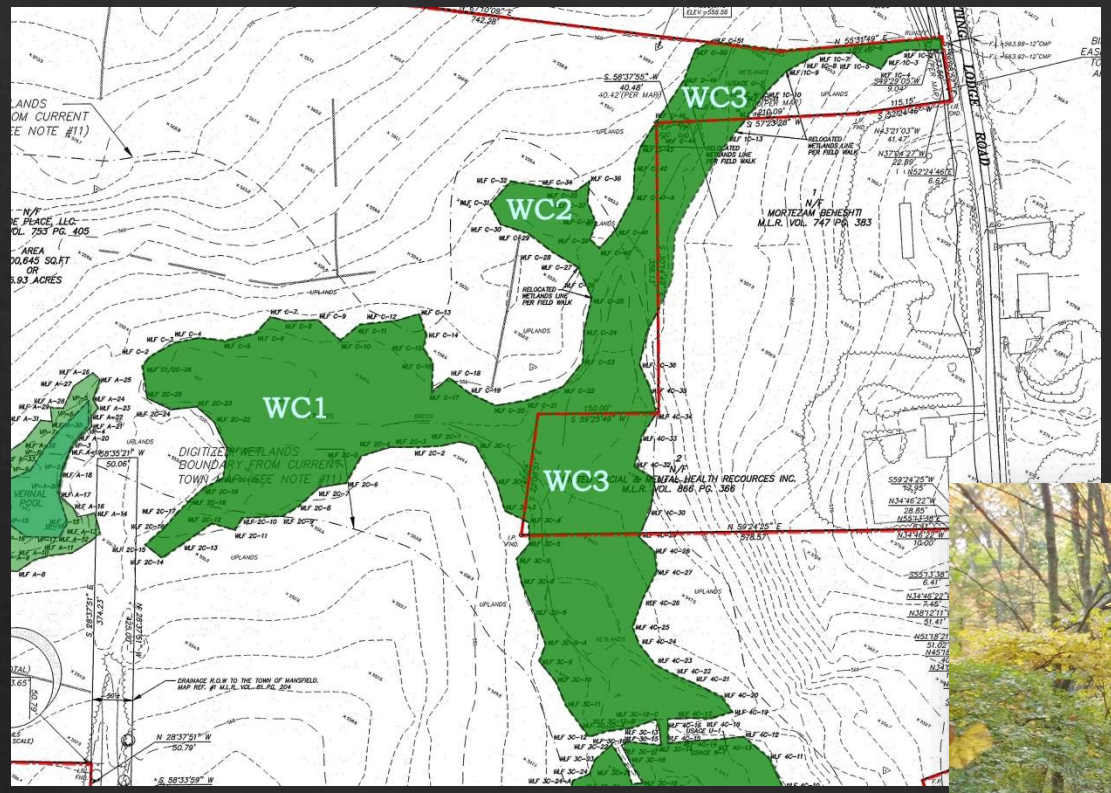
- March 2016; easterly view

Wetland ‘C2’

- April 2016
- Skunk cabbage, violets, marsh marigold

- November 2015; easterly view

Wetland ‘C3’



- Forested Swamp
- North of old road crossing
- Seasonally flooded, seasonally saturated, and saturated
- Seasonal (intermittent) watercourse

- October 2015; south-central section
- Altered hydrology

Wetland ‘C3’

- November 2015
- Central section
- Moderate density Japanese barberry understory (locally dense)

- September 2015; seasonally saturated section

Wetland ‘C3’

- Very poorly drained soils
- Organics over medium sand
- Sphagnum mosses locally abundant
- Good post-breeding habitat for wood frogs

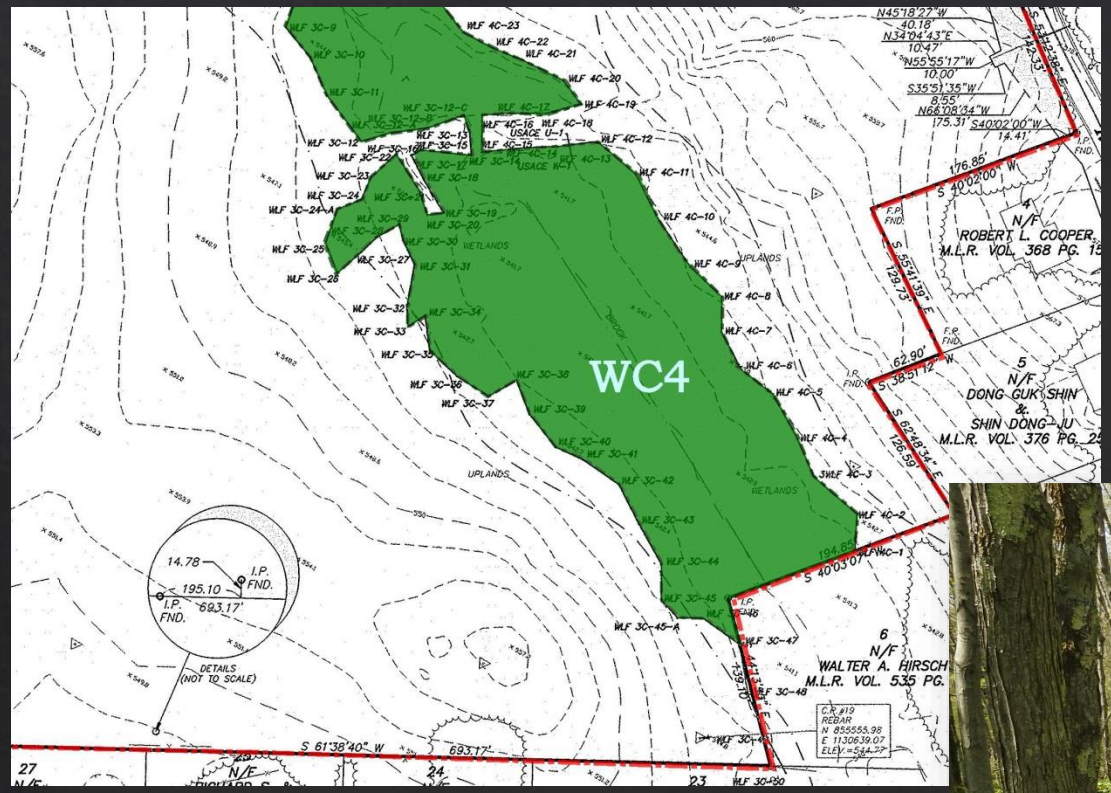
- July 2016; southern section

Wetland ‘C3’

- November 2015; upper section; southerly view

- September 2015; north-central section
- Seasonal Stream

Wetland ‘C4’



- Forested Swamp
- South of old road crossing
- Seasonally flooded, seasonally saturated, and saturated
- Seasonal (intermittent) watercourse

- May 2016; central section; northeasterly view
- Denser canopy than WC3
- Sampling Station S-1

Wetland ‘C4’

- December 2015; lower section; southerly view
- Seasonal Stream

- November 2015; northern section
- Old roadway crossing (far background)

Wetland ‘C4’

- July 2016; upper section; northwesterly view
- Seasonal Stream

- July 2016; southwesterly view

- October 2015; lower section; southerly view
- Eastern edge, seasonally saturated

Wetland ‘C4’

Surface Water Quality

FIGURE A1: Surface Water Quality Sampling Stations at the Proposed *"Lodges at Storrs"* residential community, Mansfield, CT (as seen on a April 2013 aerial photo; Google Earth)

Surface Water Quality

Table 1. Surface water analytical results in Vernal Pool (Wetland A), and an unnamed Intermittent Stream (Wetland C4) at Proposed Lodges at Storrs, Hunting Lodge Road, Mansfield, CT, on 3-24-16.

Sampling Station	*Unnamed Stream*	*Vernal Pool*	*CT Standards*
Sampling Date:	3/24/2016	3/24/2016	
Conductivity (uS/cm)	211.0	98.1	NE
pH [3]	7.06	6.01	as naturally occurs[1]
Total Phosphorus as P (µg/l)	40.00	160.00	only of natural origin[1], 23.75[2]
Ortho Phosphorus as P (µg/l)	<0.01	0.01	NE
Nitrate-N (mg/l)	0.45	1.39	0.31[2] (includes Nitrite-N)
Nitrite-N (mg/l)	<0.01	<0.01	NE
Total Keldahl Nitrogen	0.35	2.48	5[1]; 1.26[2]

Surface Water Quality

Table 1. Surface water analytical results on 5-12-16 in un-named Intermittent Stream (Wetland C4) at Proposed Lodges at Storrs, Hunting Lodge Road, Mansfield, CT, and in Cedar Swamp Brook, offsite to the west.

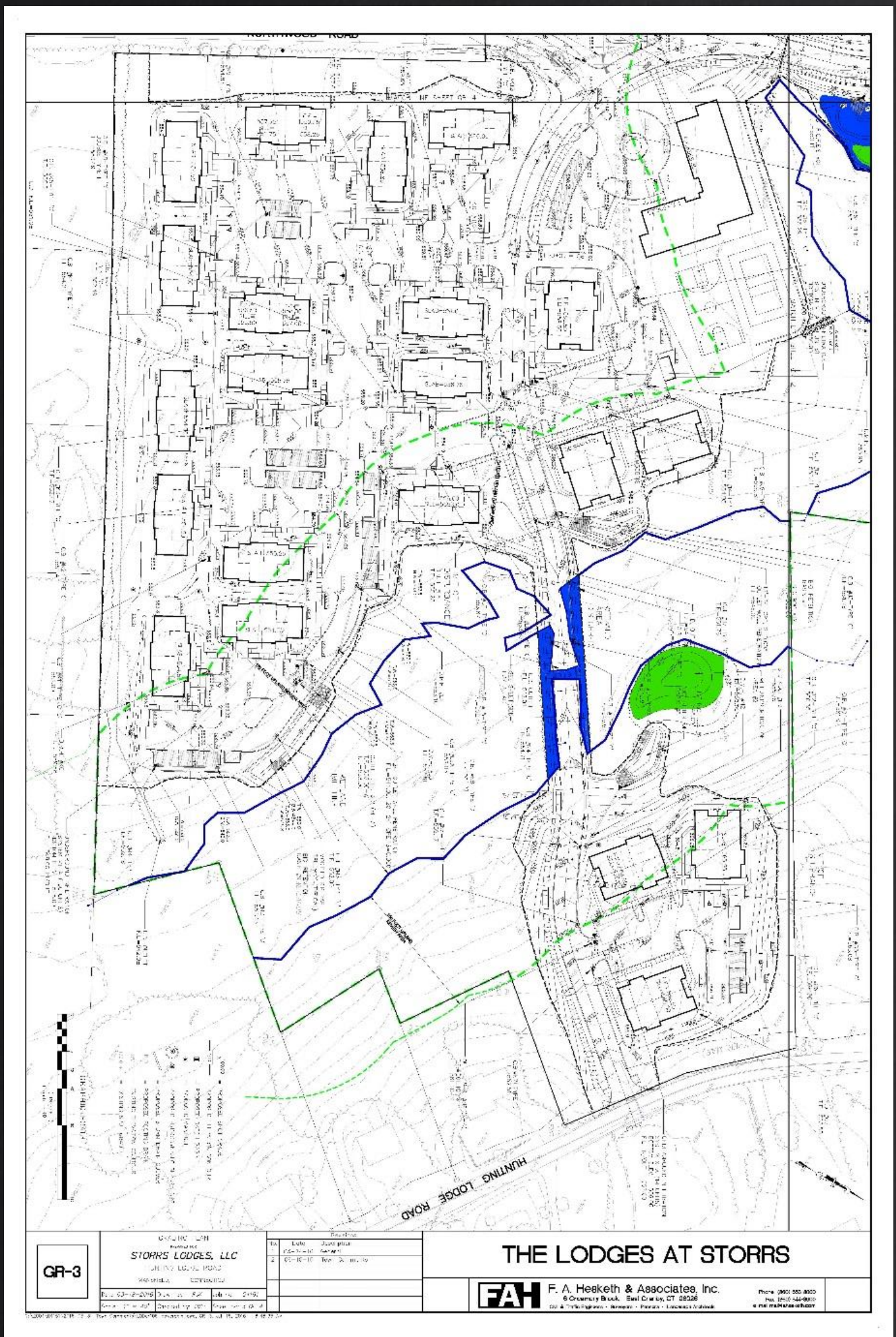
Sampling Station	*Unnamed Stream*	*Cedar Swamp Brook*	*CT Standards*
Sampling Date:	5/12/2016,	5/12/2016	
Sampling Time:	2:25 PM	4:42 PM	
Conductivity (µ S/cm)	176.7	183.0	NE
Salinity (PPT)	0.10	0.10	NE
Temperature *(degrees C)*	19	20	as naturally occurs[1]
Total Phosphorus as P (µg/l)	30	10	only of natural origin[1], 23.75[2]
Ortho Phosphorus as P (µg/l)	<0.01	<0.01	NE
Nitrate-N (mg/l)	0.38	0.10	0.31[2] (includes Nitrite-N)
Nitrite-N (mg/l)	<0.01	<0.01	NE
Ammonia (mg/l)	<0.05	<0.05	1.9[3] (chronic)
Total Keldahl Nitrogen (mg/l)	0.34	0.40	5[1]; 1.26[2]

Wetland Functions & Values

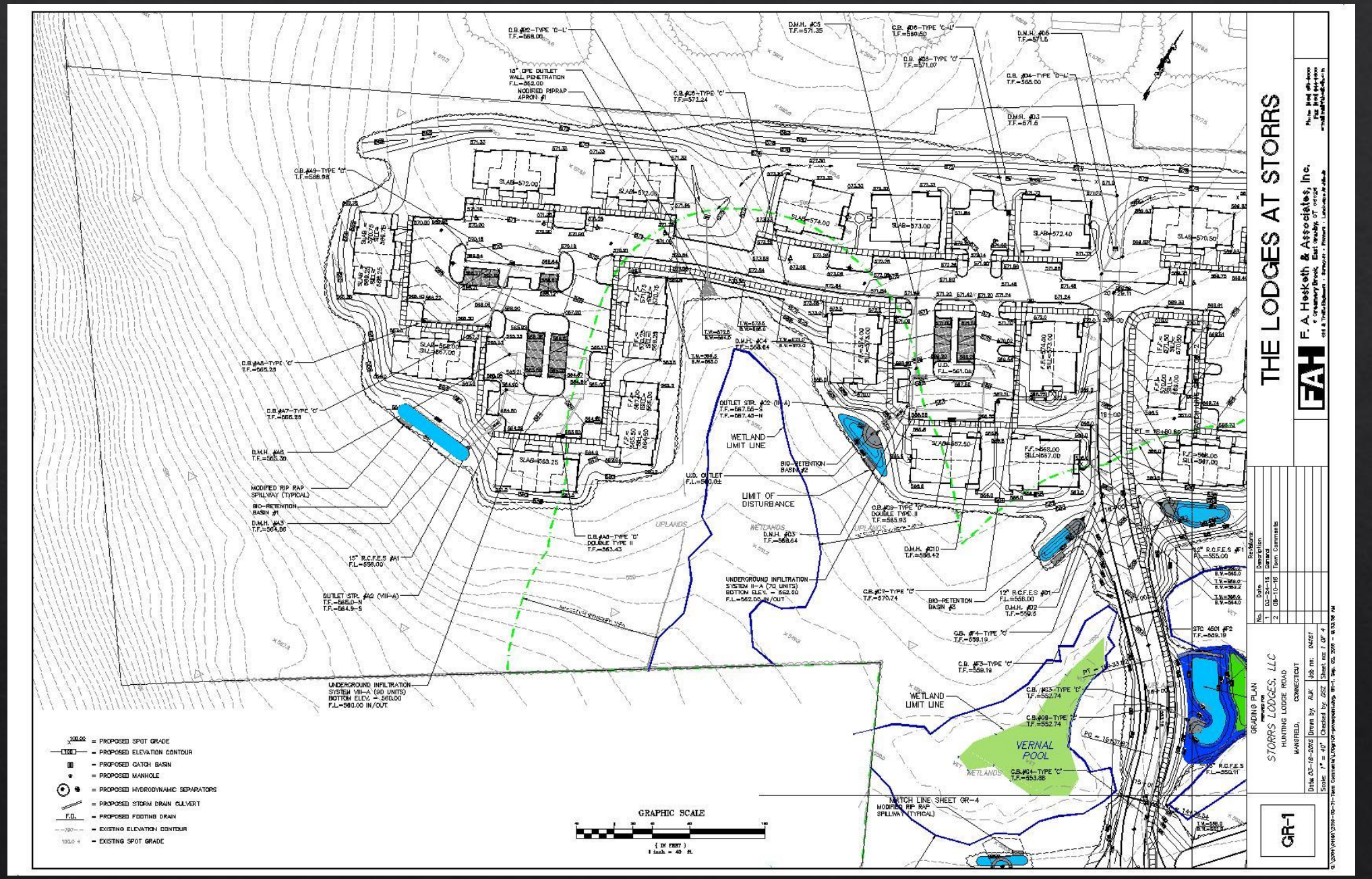
Summary of Assessment Results *(rationales in following pages)*	**Wetland A**	**Wetland B**	**Wetland C**
1 GROUNDWATER RECHARGE/DISCHARGE	Y	P	P
2 FLOODFLOW ALTERATION (Storage & Desynchronization)	Y	Y	P
3 FISH AND SHELLFISH HABITAT	N	N	N
4 SEDIMENT/TOXICANT/PATHOGEN RETENTION	N	N	Y
5 NUTRIENT REMOVAL/RETENTION/TRANSFORMATION	Y	Y	P
6 PRODUCTION EXPORT (Nutrient)	P	Y	P
7 SEDIMENT/SHORELINE STABILIZATION	N	Y	Y
8 WILDLIFE HABITAT	P	Y	P
9 RECREATION	P	Y	P
10 EDUCATIONAL/SCIENTIFIC VALUE	Y	Y	Y
11 UNIQUENESS/HERITAGE	N	N	N
12 VISUAL QUALITY/AESTHETICS	P	Y	P
13 ENDANGERED SPECIES HABITAT	N	N	N
14 FISH AND SHELLFISH HABITAT (Supporting marine resources)	N	N	N
	Present? (Y/N)	Principal? (P)	

WETLAND IMPACTS

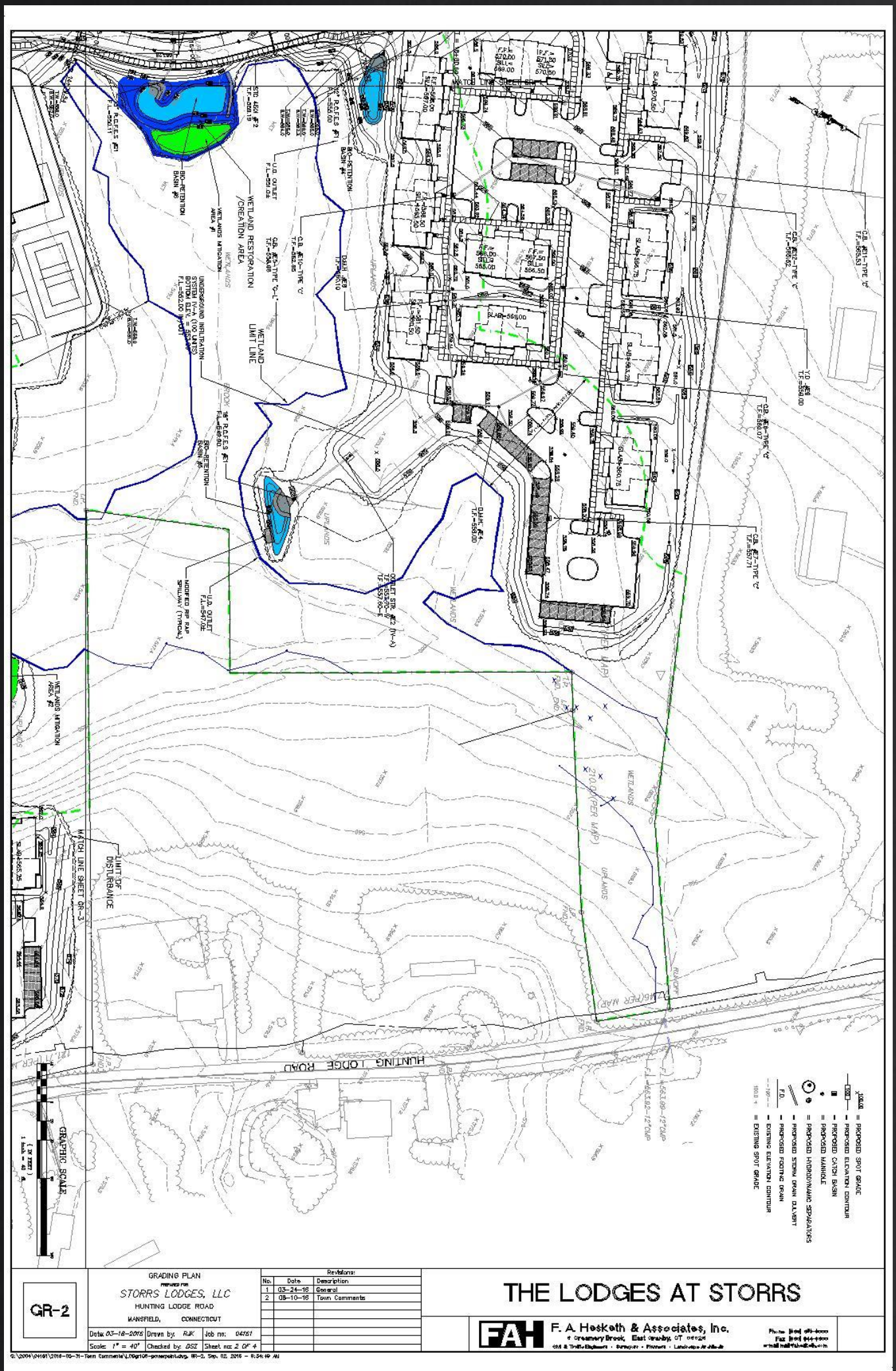
- OVERVIEW OF WETLAND IMPACTS & MITIGATION
  - DIRECT WETLAND IMPACTS
    - 4,402 sq. ft. (0.10 acres)
  - POTENTIAL INDIRECT WETLAND IMPACTS
    - Short-term
      - Erosion & Sedimentation
    - Long-term
      - Wetland Setbacks
      - Wetland Hydrology and Stream Flow
      - Water Quality
  - MITIGATION
    - Wetland Restoration - *Replication* (+/- 7,800 sq. ft.)
    - Wetland Restoration - *Invasives Removal* (+/- 1.76 acres)



Direct Wetland Impact

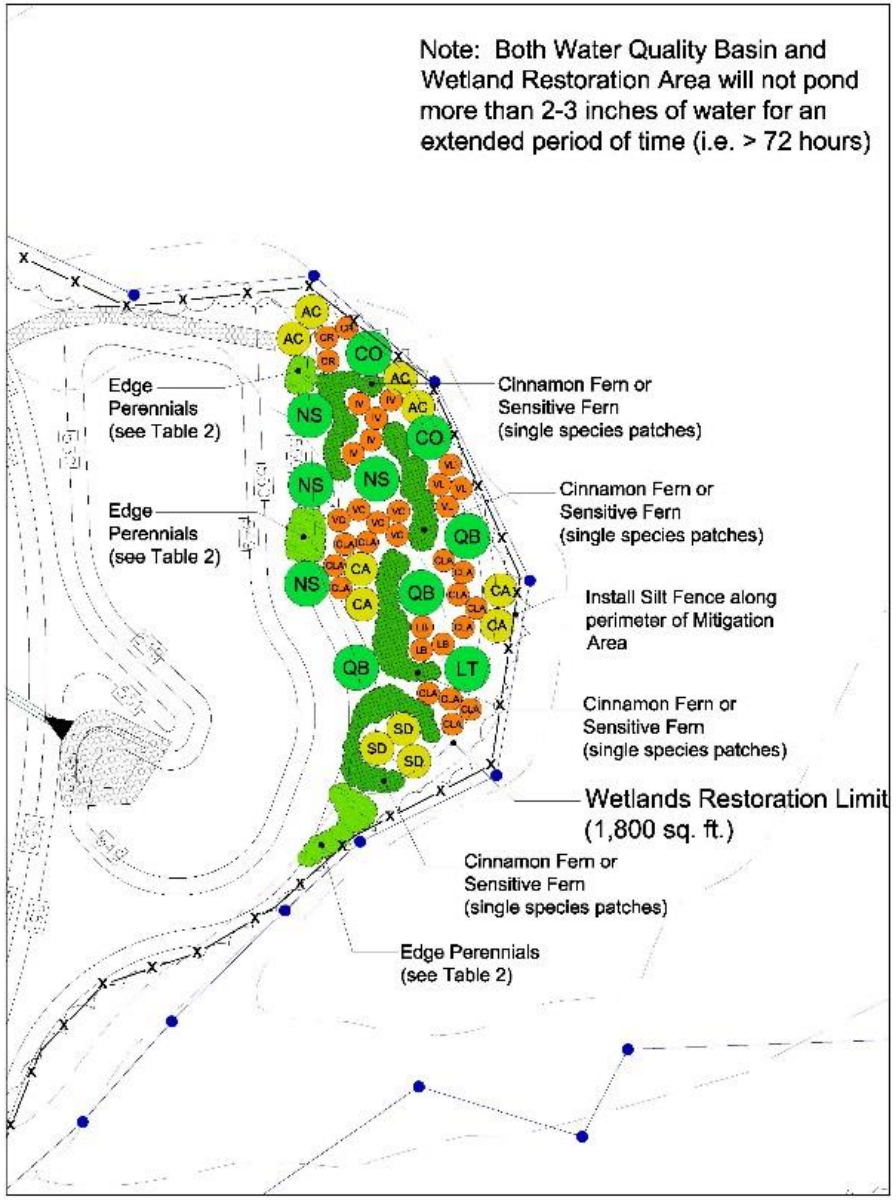


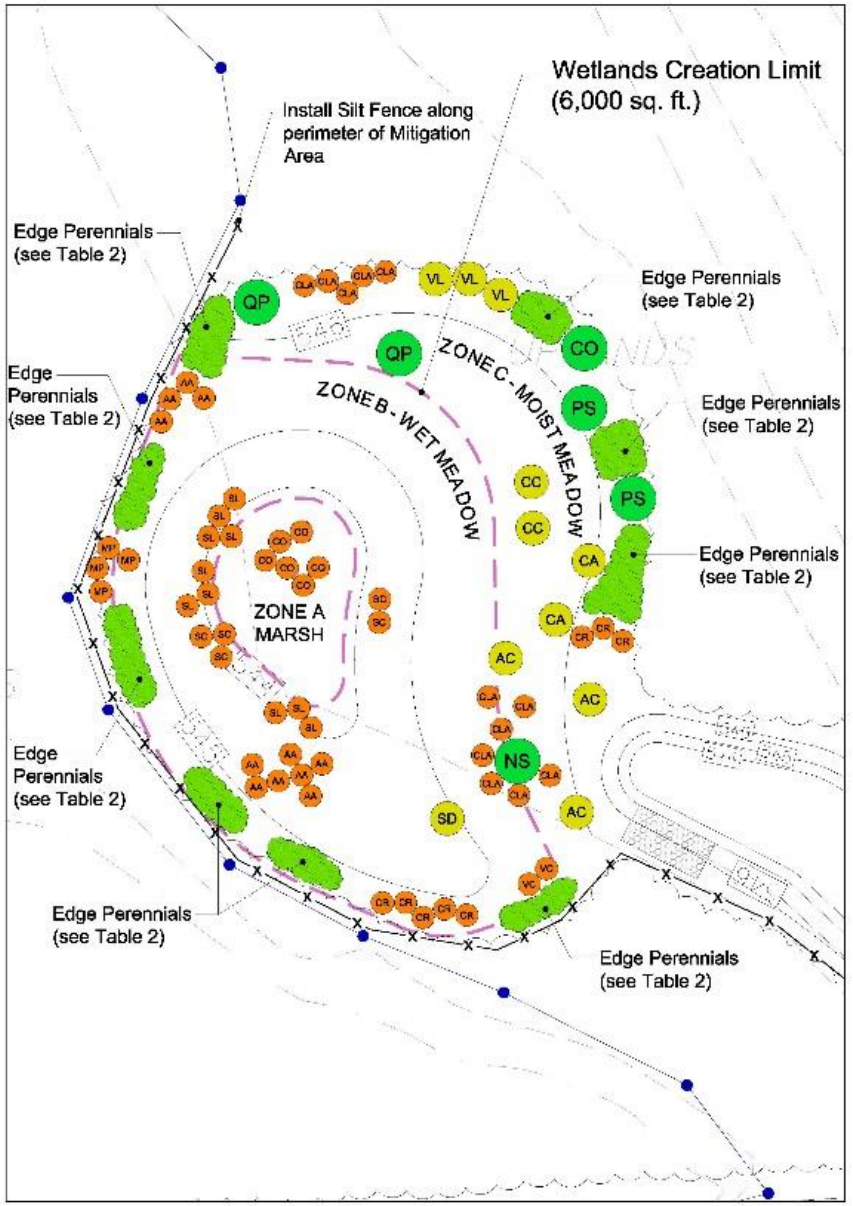
Grading Plan



Grading Plan

Mitigation Plan





THE LODGES AT STORRS

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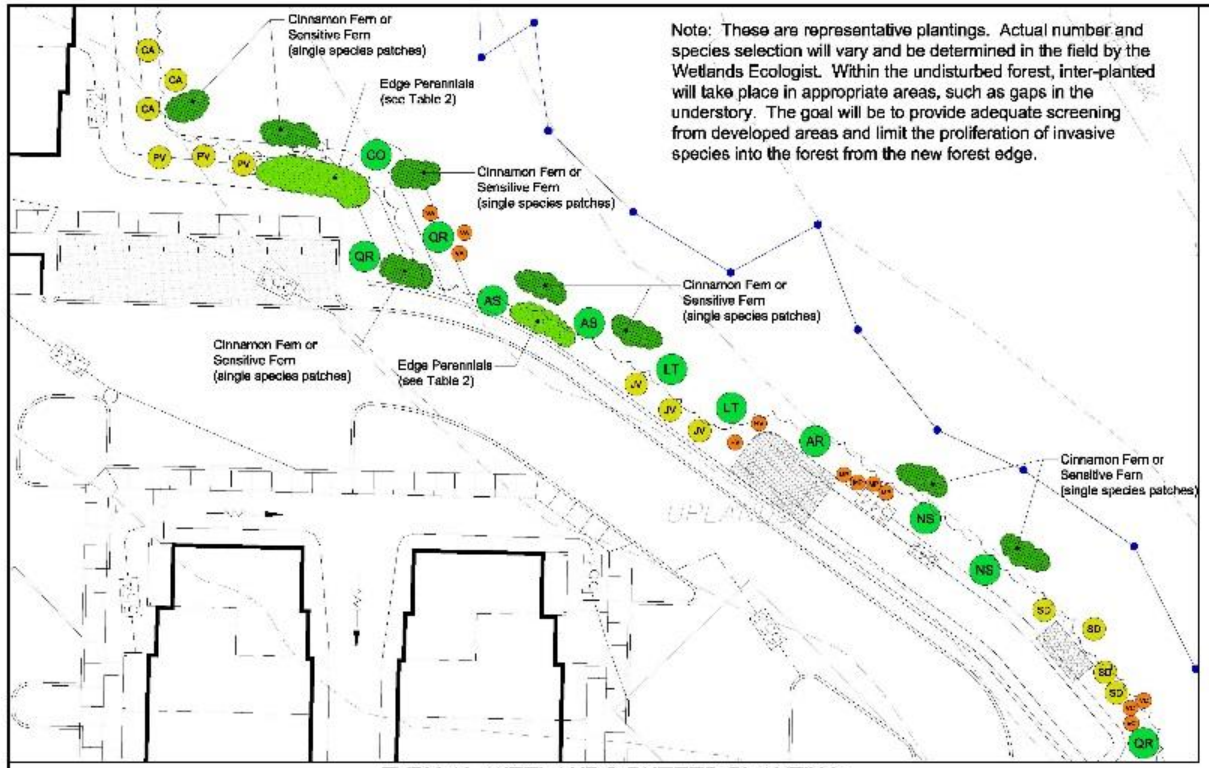
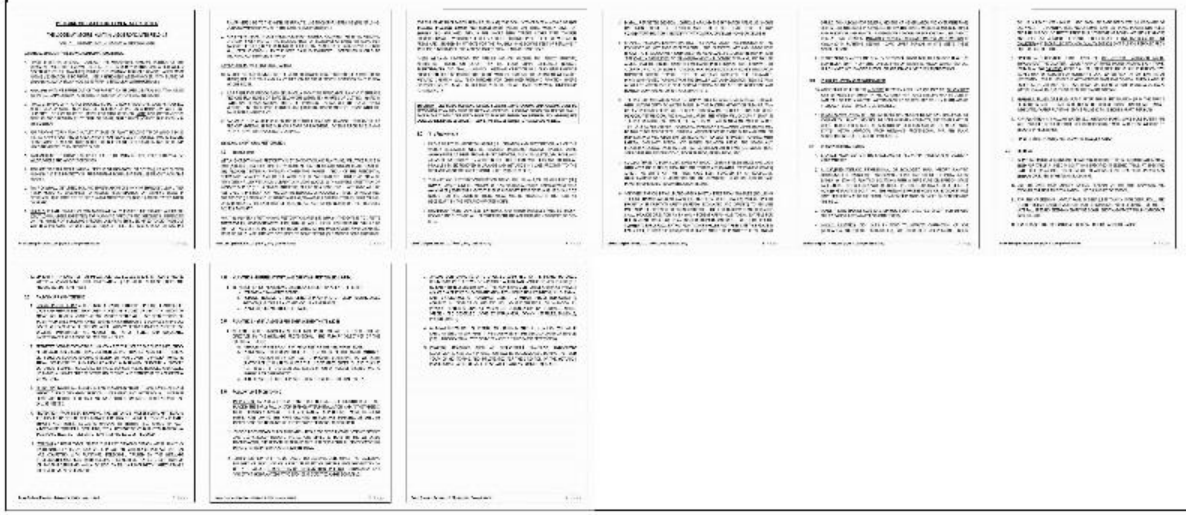
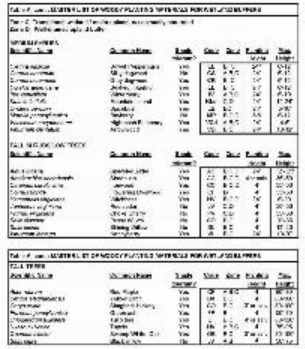
MI-1

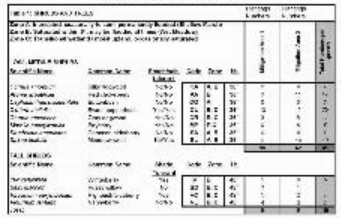
Mitigation Plan



TYPICAL WETLANDS BUFFER PLANTING







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